Discovery High School AP Chemistry – Summer Assignment 2017 **Ms. McHardy**

AP Chemistry is a very challenging course. However, with a little advance preparation, you can ensure your success from the first day of school. This summer assignment has two goals. The first is to familiarize yourself with some of the online tools we will be using this year. The second is to review some topics from first year Chemistry and to memorize some material that we will use throughout the year. *There will be a quiz covering this material the first week of school.*

Summer Assignment Checklist

- ☐ Join email list and remind
- ☐ Watch first two videos on EdPuzzle
- ☐ Memorize common elements
- ☐ Memorize polyatomic ions and metal cations
- ☐ Memorize the solubility rules
- ☐ Watch the two stoichiometry videos on EdPuzzle
- ☐ Complete the survey

Part 1: Get Connected - Please use your real first and last name.

1. EMAIL: Email Ms. McHardy at mchardy.chemistry@gmail.com to join the email list. Use the subject "AP Chemistry". Tell me one thing you look forward to doing this summer and one thing you look forward to when school resumes in August.
2. REMIND: Join the AP Chem group by texting "@dhs-apchem" to 81010. Note: your parents are welcome to join this group. Please ask them to include your name with their name.
3. ED PUZZLE: Create an account on EdPuzzle and join the class to access the tutorial videos using the code "zehmoro" or the link https://edpuzzle.com/join/zehmoro. These videos may appear out of order on EdPuzzle. They will make a lot more sense if watched in numeric order. One also refers to our current block schedule. We will be going to a more traditional schedule next year with a few days each month on block. Everything else in the videos is accurate.

Part 2: Review & Memorization

4. Watch the first two videos on EdPuzzle; "Welcome to AP Chem" and "Memorization".
5. PERIODIC TABLE: The AP Chemistry periodic table does not contain any element names, only symbols. Before school begins in the fall, you must be able to recognize these common element symbols. Bold items are anomalous names.

aluminum	Al	chromium	Cr	**lead**	**Pb**	radon	Rn
antimony	**Sb**	cobalt	Co	lithium	Li	rubidium	Rb
argon	Ar	**copper**	**Cu**	magnesium	Mg	selenium	Se
arsenic	As	fluorine	F	manganese	Mn	silicon	Si
barium	Ba	francium	Fr	**mercury**	**Hg**	**silver**	**Ag**
beryllium	Be	gallium	Ga	neon	Ne	**sodium**	**Na**
bismuth	Bi	germanium	Ge	nickel	Ni	strontium	Sr
boron	B	**gold**	**Au**	nitrogen	N	sulfur	S
bromine	Br	helium	He	oxygen	O	**tin**	**Sn**
calcium	Ca	hydrogen	H	phosphorus	P	**tungsten**	**W**
carbon	C	iodine	I	platinum	Pt	uranium	U
cesium	Cs	**iron**	**Fe**	**potassium**	**K**	**xenon**	**Xe**
chlorine	Cl	krypton	Kr	radium	Ra	zinc	Zn

There's a copy of the AP Chemistry periodic table at the end of this document.
Use this Quizlet to review the most common element names: https://quizlet.com/_2bp85v
Try playing the "Name That Element" category on your phone with QuizUp: https://www.quizup.com/en
Overachiever? Use this Quizlet to review all 118 of the element names: https://quizlet.com/_2bp8x4

6. IONS: Memorize the name, symbol and charge of the Polyatomic Ions and the multiple charges of the Transition Metals. Use this Quizlet to review these ions: https://quizlet.com/_2bp98b

Metal Cations	
Sb^{+3} Antimony(III) [aka antimonous]	Pb^{+2} Lead(II) [aka plumbous]
Sb^{+5} Antimony(V) [aka antimonic]	Pb^{+4} Lead(IV) [aka plumbic]
Bi^{+3} Bismuth(III) [aka bismuthous]	Mn^{+2} Manganese(II)
Bi^{+5} Bismuth(V) [aka bismuthic]	Mn^{+3} Manganese(III)
Cd^{+2} Cadmium	Mn^{+4} Manganese(IV)
Cr^{+2} Chromium(II) [aka chromous]	Mn^{+7} Manganese(VII)
Cr^{+3} Chromium(III) [aka chromic]	Hg_2^{+2} Mercury(I)
Co^{+2} Cobalt(II) [aka cobaltous]	Hg^{+2} Mercury(II)
Co^{+3} Cobalt(III) [aka cobaltic]	Ni^{+2} Nickel(II)
Cu^{+1} Copper(I) [aka cuprous]	Ni^{+3} Nickel(III)
Cu^{+2} Copper(II) [aka cupric]	Ag^{+1} Silver
Au^{+1} Gold(I) [aka aurous]	Sn^{+2} Tin(II) [aka stannous]
Au^{+3} Gold(III) [aka auric]	Sn^{+4} Tin(IV) [aka stannic]
Fe^{+2} Iron(II) [aka ferrous]	Zn^{+2} Zinc
Fe^{+3} Iron(III) [aka ferric]	

7. SOLUBILITY RULES: Memorize the Solubility Rules. Make flashcards or use the other memorization tools provided to find what works best for you.

SOLUBILITY RULES

Solubility is a result of an interaction between polar water molecules and the ions which make up an ionic crystal.

1. All compounds containing Group 1 alkali metal cations and the ammonium ion (NH_4^+) are soluble.
2. All compounds containing NO_3^-, ClO_4^-, ClO_3^-, and $C_2H_3O_2^-$ anions are soluble.
3. All chlorides, bromides, and iodides are soluble except those containing Ag^+, Pb^{2+}, or Hg^{2+}.
4. All sulfates are soluble except those containing Hg^{2+}, Pb^{2+}, Sr^{2+}, Ca^{2+}, or Ba^{2+}.
5. All hydroxides are insoluble except compounds of the alkali metals, Ca^{2+}, Sr^{2+}, and Ba^{2+}.
6. All compounds containing PO_4^{3-}, S^{2-}, CO_3^{2-}, and SO_3^{2-} ions are insoluble except those that also contain alkali metals or NH_4^+.

Use this Quizlet to practice applying the solubility rules https://quizlet.com/_2bpc7e.
Try this video for a mnemonic device: https://www.youtube.com/watch?v=AsCLuLS-yZY. Note that there is one mistake in the rules on this video. Did you find it?

Names, Formulas, and Charges of Some Common Polyatomic Ions

NH_4^+	Ammonium	PO_4^{3-}	Phosphate	MnO_4^-	Permanganate
$C_2H_3O_2^-$	Acetate	HPO_4^{2-}	Hydrogen phosphate	MnO_4^{2-}	Manganate
NH_2^-	Amide	$H_2PO_4^-$	Dihydrogen phosphate	FO^-	Hypofluorite
N_3^-	Azide	SO_4^{2-}	Sulfate	ClO^-	Hypochlorite
BO_3^{3-}	Borate	HSO_4^-	Hydrogen sulfate	ClO_2^-	Chlorite
CO_3^{2-}	Carbonate	SO_3^{2-}	Sulfite	ClO_3^-	Chlorate
HCO_3^-	Hydrogen carbonate	HSO_3^-	Hydrogen sulfite	ClO_4^-	Perchlorate
$C_2O_4^{2-}$	Oxalate	$S_2O_3^{2-}$	Thiosulfate	BrO^-	Hypobromite
CN^-	Cyanide	HS^-	Hydrogen sulfide	BrO_3^-	Bromate
OCN^-	Cyanate	OH^-	Hydroxide	BrO_4^-	Perbromate
SCN^-	Thiocyanate	O_2^{2-}	Peroxide	IO^-	Hypoiodite
NO_2^-	Nitrite	CrO_4^{2-}	Chromate	IO_3^-	Iodate
NO_3^-	Nitrate	$Cr_2O_7^{2-}$	Dichromate	IO_4^-	Periodate

8. NOMENCLATURE: Review naming ionic and covalent compounds.

Naming Binary Ionic Compounds

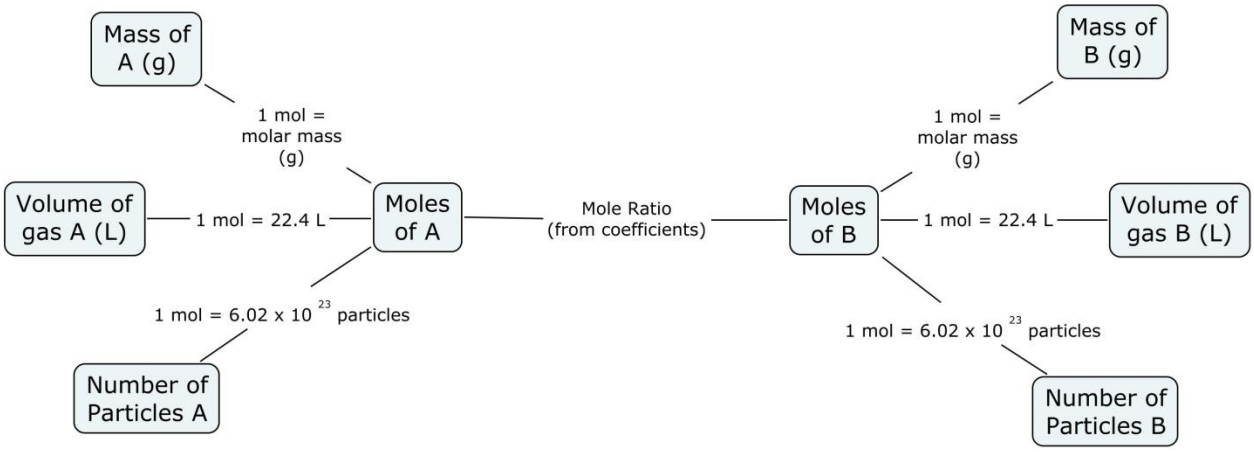
1. Determine the charges on the cation (positive metal ion) and the anion (negative nonmetal ion).
   Ex: magnesium is Mg^{2+} and chlorine becomes Cl^-
2. Balance the charges (charges should net zero).
   Ex: the ratio of Mg^{2+} to Cl^- is 1:2
3. Cation is always written first (in name and in formula)
   Ex: the formula is $MgCl_2$
4. Combine element names and change the ending of the anion name to –ide.
   Ex: magnesium chloride
5. The Roman numeral after a transition metal indicates its charge.
   Ex: copper(II) is Cu^{2+}

Naming Binary Covalent Compounds

1. The number of each atom in the chemical formula must be indicated.
2. List the element names in the same order as they appear in the formula.
   Ex: P_2O_5 is diphosphorus pentoxide
3. If the subscript of the first element is one, the 'mono' is omitted.
   Ex: CO_2 is carbon dioxide

The number of each atom is given by prefixes		
	Mono-	1
	Di-	2
	Tri-	3
	Tetra-	4
	Penta-	5
	Hexa-	6
	Hepta-	7
	Octa-	8
	Nona-	9
	Deca-	10

9. STOICHIOMETRY: Watch the two videos on EdPuzzle.



10. SURVEY: After you have completed your summer assignment, respond to this survey to timestamp your completion: http://goo.gl/forms/R8vPDrJsvQh6Z9lE2

First Week Quiz

Note: the quiz is NOT multiple choice. Be prepared to show work and explain answers.

- Given an element's symbol, provide the element's name and vice versa.
- Given an ionic compound, determine if it is soluble or insoluble in water.
- Solve stoichiometry and mole conversions problems like the ones in the videos you watched.
- Given a polyatomic ion, provide its chemical formula (including charge) and vice versa.

Lab Notebook

A bound lab notebook is required for this course and a carbonless notebook is highly recommended. Carbonless lab notebooks can be found at most bookstores (expensive route) or online (Amazon search for carbonless lab notebook). Most people find the 50 page (50 sets) version adequate, but if you write overly large, or prefer to leave a lot of space around your writing, then you should consider the 75 or 100 page book. The other choice is a quad-ruled bound composition notebook. This will not provide you with duplicate copies of your work, but may be easier to obtain. Please note that a regular spiral-bound notebook is NOT acceptable. *We will complete our first formal lab the second week of school and a bound lab notebook must be used.*

That's it! If you have any questions, please email me at mchardy.chemistry@gmail.com. Have a great summer and I'll see you in August!

PERIODIC TABLE OF THE ELEMENTS

1 H 1.008																	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.30											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.91	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57 *La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.2	77 Ir 192.2	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.02	89 †Ac 227.03	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (271)	111 Rg (272)							

*Lanthanide Series	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.4	63 Eu 151.97	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
†Actinide Series	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)